

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): **W. Liu, et al.**

Application No: **10/679,806**    **Conf. 3311**

Filing Date: **October 6, 2003**

Attorney Docket No: **P26257-C USA**

Title: **EPOXY-BASED ANCHORING  
COMPOSITION**

Art Group: **1711**

Examiner: **O. Asinovsky**

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*Attn: Board of Patent Appeals and Interferences*

**APPELLANT'S BRIEF**

The Notice of Appeal was filed in the above-mentioned case on June 26, 2007.

Submitted herewith is a petition for a three-month extension of time to file an Appeal Brief and the associated fee. Also included is the requisite fee of \$510.00, as set forth under 37 C.F.R. 1.17(f), for filing the Appeal Brief. If any other fees are required in order to enter this Brief, please charge such fees to Deposit Account No. 19-5425.

**1. REAL PARTY OF INTEREST**

The present application has been assigned to Illinois Tool Works, Inc., having its principle place of business at 3600 West Lake Ave, Glenview, Illinois. Accordingly, Illinois Tool Works, Inc., is the real party of interest.

**2. RELATED APPEALS AND INTERFERENCES**

None.

**3. STATUS OF CLAIMS**

- A. Claims cancelled: 2 – 3, 13, 24 – 25, 37 – 51
- B. Claims withdrawn from consideration, but not cancelled: 16 – 22
- C. Claims pending: 1, 4 – 12, 14, 15, 23, and 26 – 36
- D. Claims allowed: None
- E. Claims objected to: None
- F. Claims rejected: 1, 4 – 12, 14, 15, 23, and 26 – 51
- G. Claims appealed: 1, 4 – 12, 14, 15, 23, and 26 – 36

Appealed claims 1, 4 – 12, 14, 15, 23, and 26 – 36, as currently pending, are attached hereto as the Claims Appendix.

#### 4. STATUS OF AMENDMENTS

Concurrently with this Appeal Brief, Appellants request to cancel claims 37 – 51 in order to facilitate the allowance of this application. This proposed amendment has not yet been acted upon by the Examiner.

#### 5. SUMMARY OF THE CLAIMED SUBJECT MATTER

The claims argued in the present brief, as having an independent basis for allowance, are as follows:

- Claim 1: A curable adhesive composition for anchoring materials in or to concrete or masonry (*p.5, ¶ 1*) comprising:
- a. from about 10 wt % to about 25 wt % of a polymerizable vinyl ester compound (*p. 3, ¶ 2*);
  - b. an ethylenically unsaturated monomer reactive with said polymerizable vinyl ester (*p. 4, ¶ 2*);
  - c. from about 5 wt % to about 10 wt % of reactive multifunctional acrylate (*p. 5, ¶ 5*);
  - d. curing catalyst (*p. 4, ¶ 4 & p. 13, ¶ 1*); and
  - e. activator (*p. 4, ¶ 4 & p. 12, ¶ 5*);
- said adhesive composition having a pull out performance after one hour at a temperature of 23°C of at least about 70 KN (*p. 4, ¶ 5*).

- Claim 23: A curable adhesive composition for anchoring materials in or to concrete or

masonry (*p.5, ¶ 1*) comprising:

- a. from about 10 wt % to about 25 wt % of a polymerizable vinyl ester compound (*p. 3, ¶ 2*);
- b. an ethylenically unsaturated monomer reactive with said polymerizable vinyl ester (*p. 4, ¶ 2*);
- c. from about 5 wt % to about 10 wt % of reactive multifunctional acrylate (*p. 5, ¶ 5*) wherein said acrylate comprises a major proportion of acrylate that is at least tri-functional (*p. 5, ¶ 3 & claim 4*);
- d. curing catalyst (*p. 4, ¶ 4 & p. 13, ¶ 1*); and
- e. activator (*p. 4, ¶ 4 & p. 12, ¶ 5*).

## **6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

Applicants request that the Board review the rejection of claims 1 and 23 as being unpatentable under 35 U.S.C. § 103(a) over EP 0 875 546 (Parish) in view of US 6,015,845 (Yonetani).

## **7. ARGUMENTS**

The rejection of claims 1 and 23 under 35 U.S.C. § 103(a) is respectfully traversed because one of ordinary skill in the art at the time of the present invention, when presented with the disclosure of Parish, either alone or in combination with Yonetani, would not have been motivated to produce the presently claimed invention.

**A) The Claimed Invention**

Independent claims 1 and 23 are directed to an adhesive composition comprising *from about 10 wt % to about 25 wt %* of a polymerizable vinyl ester compound, an ethylenically unsaturated monomer, reactive multifunctional acrylate, curing catalyst and activator. Independent claim 1 further recites that the composition has a *pull out performance after one hour at a temperature of 23°C of at least about 70 KN*.

**B) The Cited References**

Parish discloses a *coating composition* comprising a vinyl ester, a non-aromatic multifunctional acrylate which serves as a reactive diluent, a catalyst, and an optional activator (*see* Parish, paragraphs [0006], [0008], [0012], [0016] and [0017]). Parish does *not* teach or suggest an *adhesive composition*, or expressly disclose or suggest anything respecting adhesive compositions. Parish does not contain a specific disclosure of amounts at which the vinyl ester may be present in the composition. Parish also does not disclose any pull out performance test results.

Yonetani discloses an adhesive composition comprising an epoxy acrylate resin which may contain a vinyl ester group, a reactive monomer comprising an ester of carboxylic acid and an alcohol, a curing agent comprising an organic peroxide, and an accelerator comprising a tertiary aromatic amine containing a hydroxyl group in a nitrogen substituent (*see* Col. 2, lines 31 to 63; Col. 3, lines 1 to 48). Yonetani discloses that the resin is present in an amount of *30 wt % to 90 wt %* (*see* Col. 3, lines 22 to 27). In particular, Yonetani exemplifies adhesive compositions containing the resin in the amount of 39 wt% (Examples 11 to 19), 54 wt% (Examples 4 to 10), 44 wt% (Examples 1 and 3)

and 64 wt% (Example 2) (*see* Col. 5 to Col. 9).

According to the teachings of Yonetani, the tensile load performance of its compositions after **24 hours at 60 °C** ranged from 6 to 6.7 tons (**53.4 to 59.6 KN**) (*see* Col. 5, lines 32 to 67, Col. 6, lines 1 to 10, Col 9-12, Table 1). Applicants note that even though the material in Yonetani had been cured for 24 hours, the load performance of the material of the claimed invention achieves much higher tensile performance (80.5 KN vs. 59.6 KN) after a cure period of only one hour. This result is particularly surprising since load performance generally increases with longer cure times. It is also notable that after 24 hours of curing at 80 °C, the load performance of the claimed invention is significantly better than the load performance of material described in Yonetani (61.9 KN vs. 59.6 KN), even though the Yonetani material was cured at a lower elevated temperature. This result is also surprising since load performance typically degrades at elevated temperatures.

These results achieved by the claimed invention are dramatically superior and entirely unexpected base on the teaching of the prior art, as explained below.

**C) The Cited Patents Do Not Suggest The Claimed Range of Reactive Multifunctional Acrylate**

One of ordinary skill in the art, when presented with the disclosure of Parish at the time of the present invention, would not be motivated to produce an adhesive composition or modify Parish to produce the presently claimed adhesive composition. Parish does not disclose or suggest the use of any specific amount of polymerizable vinyl ester present in its *coating* composition, let alone an amount of from about 10 wt % to about 25 wt % as recited in independent claims 1 and 23. When presented with the disclosure of Parish, one

of ordinary skill in the art at the time of the present invention would simply not have been motivated to produce the *adhesive* composition of present invention. As such, independent claims 1 and 23 are patentably non-obvious over Parish.

Assuming, *arguendo*, that Parish is properly combinable with Yonetani (which it is not), such a combination also does not disclose or suggest the polymerizable vinyl ester present in an amount of from about 10 wt % to about 25 wt % as recited in independent claims 1 and 23. In particular, the Yonetani discloses polymerizable vinyl ester in an amount of 30 wt % to 90 wt %. As such, Yonetani does not provide the disclosure of the about 10 wt % to about 25 wt % of polymerizable vinyl ester missing from Parish and required by independent claims 1 and 23. Since the cited references do not teach each and every limitation of the claimed invention, they do not support the Examiner's obviousness rejection.

Further, the cited patents fail to contain any suggestion or basis to suspect that the dramatically superior performance achieved in accordance with the requirements of the present claims, as explained below.

**D) The Superior Pull-Out Performance Is Unexpected in View of the Cited Patents**

Parish does not disclose or suggest the unexpectedly superior pull out performance after one hour at a temperature of 23°C of at least about 70 KN as recited in independent claim 1 (*see* specification at page 4, paragraph 2; page 6, paragraph 4). Further, Parish contains no suggestion that would motivate one of ordinary skill at the time of the present invention to modify the *coating* composition of Parish with the reasonable expectation of obtaining an *adhesive* composition having the pull-out performance values of the present

invention. Nevertheless, the Office Action asserts that the adhesive compositions produced by Parish inherently exhibit the claimed pull-out performance, allegedly because Parish produces an “analogous chemical formulated composition”. Notwithstanding the Examiner’s acknowledgment that the amount of polymerizable vinyl ester compound is not disclosed the references (i.e., “The content of a polymerizable vinyl ester compound in the specified range up to 25 wt. % in the present claims *is close* to the range of 30 wt. % in [the] Yonetani [disclosure].” (emphasis added)), the Examiner does not identify any other rationale or evidence to support such an allegation of inherency.

Neither Parish nor Yonetani disclose the presently claimed composition, particularly a composition having a polymerizable vinyl ester in the amount of about 10 wt % to about 25 wt %. Where the compositions are not the same, a simple allegation of inherency is insufficient where such allegation is without a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic *necessarily* flows from the teachings of the applied prior art (*see* MPEP § 2112 “the fact that a certain result or characteristic may occur is not sufficient to establish the inherency of that result or characteristic”).

Furthermore, it is well settled that a characteristic feature of a composition is only inherent if the composition itself is known. (See e.g., *In re Antonie*, 559 F.2d 618, 620 (CCPA 1977), “In determining whether the invention as a whole would have been obvious under 35 U.S.C. 103, ... we look ... to those properties of the subject matter which are inherent in the subject matter *and* are disclosed in the specification.” (emphasis original); *In re Papesch*, 315 F.2d 381, 391 (CCPA 1963), indicating that obviousness cannot be predicated on what is not known at the time an invention was made, even if the inherency of



a certain feature is later established.) Thus, an inherency argument based on alleged obviousness is misplaced. See *In re Dillion*, 919 F.2d 688 (Fed. Cir. 1990), citing *In re Spormann*, 363 F.2d 444, 448 (CCPA 1966) (“[T]he **inherency** of an advantage and its **obviousness** are entirely different questions. That which may be inherent is not necessarily known. Obviousness cannot be predicated on what is unknown.”). Accordingly, inherency in Parish of the claimed pull out performance values has not been established factually and is nevertheless legally irrelevant.

The Examiner does not dispute the fact that the claimed invention achieves significantly superior load performance. Instead, the Examiner argues that it would be obvious to adjust the amount of polymerizable vinyl ester to match the Appellant’s composition in order to achieve the same adhesive performance. However, in *In re Newell*, 891 F.2d 899 (Fed. Cir. 1989), the court held that “a retrospective view of inherency is not a substitute for some teaching or suggestion which supports the selection and use of the various elements in the particular claimed combination.” (citing *Smithkline Diagnostics v. Helena Laboratories Corp.*, 859 F.2d 878, 886-87, (Fed.Cir.1988). As such, independent claims 1 and 23 are patentably non-obvious over the cited references for at least this reason.

The combination of Parish and Yonetani also do nothing to suggest the highly desirable pull out performance achieved by the claimed invention. Thus, the invention is unexpected and surprising in view of the teachings of the prior patents. For example, the compositions of Yonetani are described as achieving a tensile load performance tests, with pull out performance after **24 hours at 60°C** of from 6 to 6.7 tons (**53.4 to 59.6 KN**). In dramatic contrast, the compositions as now claimed achieve superior performance after **one hour at 23°C**. For example, as recited in claim 1, the compositions of the present

inventions achieve a greater performance (**at least about 70 KN**) after a much shorter cure time (**23 hours less**). This result is truly extraordinary and surprising. One of ordinary skill in the art would not expect that an adhesive composition formulated with a concentration of polymerizable vinyl ester different than that of Yonetani would exhibit such unexpectedly higher pull-out performance values. As such, the pending claims are patentably non-obvious over the combination of Parish with Yonetani or Nakamura for at least this reason.

## 8. CONCLUSION

For at least the reasons set forth above, applicants respectfully request this Board to overrule the Examiner's rejection and to allow claims 1, 23, and 37, and each claim that is dependent therefrom.

Respectfully submitted,

Dated: November 26, 2007

/Joseph F. Posillico/  
Joseph F. Posillico  
Registration No. 32,290

Dated: November 26, 2007

/Jimmie Johnson/  
Jimmie Johnson  
Registration No. 52,485

Synnestvedt & Lechner  
2600 Aramark Tower  
1101 Market Street  
Philadelphia, PA 19107  
Telephone: (215) 923-4466

**CLAIMS APPENDIX CLAIMS INVOLVED IN THIS APPEAL:**

Claim 1. A curable adhesive composition for anchoring materials in or to concrete or masonry comprising:

- a. from about 10 wt % to about 25 wt % of a polymerizable vinyl ester compound;
- b. an ethylenically unsaturated monomer reactive with said polymerizable vinyl ester;
- c. from about 5 wt % to about 10 wt % of reactive multifunctional acrylate;
- d. curing catalyst; and
- e. activator;

said adhesive composition having a pull out performance after one hour at a temperature of 23°C of at least about 70 KN.

Claims 2-3 (Cancelled).

Claim 4. The adhesive composition of claim 1 wherein said reactive multifunctional acrylate comprises acrylate that is at least tri-functional.

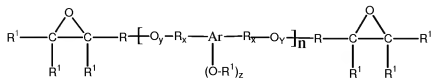
Claim 5. The adhesive composition of claim 4 wherein said reactive multifunctional acrylate consists essentially of acrylate that is at least tri-functional.

Claim 6. The adhesive composition of claim 4 wherein said reactive multifunctional acrylate comprises acrylate that is at least tetra-functional.

Claim 7. The adhesive composition of claim 6 wherein said reactive multifunctional acrylate consists essentially of acrylate that is at least tetra-functional.

Claim 8. The adhesive composition of claim 1 wherein said polymerizable vinyl ester comprises the reaction product of an epoxy compound and a compound containing an

ethylenically unsaturated group, said epoxy compound corresponding to formula (I),



wherein

Ar is substituted or unsubstituted aryl.

R is substituted or unsubstituted divalent radical derived from alkyl, oxyalkyl, arylalkyl, or oxyarylkyl,

R<sup>1</sup> is independently H or R,

x, y and z are each independently 0 to 5 provided that x and y can not both be zero, and

n is from 1 to 5.

Claim 9. The adhesive composition of claim 1 wherein said ethylenically unsaturated monomer comprises vinyl toluene.

Claim 10. The adhesive composition of claim 1 wherein the weight ratio of vinyl ester to said ethylenically unsaturated monomer is from about 0.8 to about 3.

Claim 11. The adhesive composition of claim 10 wherein said ethylenically unsaturated monomer comprises vinyl toluene.

Claim 12. The adhesive composition of claim 11 wherein said ethylenically unsaturated monomer consists essentially of vinyl toluene.

Claim 13 (Cancelled).

Claim 14. The adhesive composition of claim 1 having a pull out performance after about

24 hours at a temperature of 23°C of at least about 80 KN.

Claim 15. The adhesive composition of claim 1 having a pull out performance after about 24 hours at a temperature of 80°C of at least about 50 KN.

Claim 16 (Withdrawn). A curable adhesive composition for anchoring materials in or to concrete or masonry comprising: a curable resin; from about 5 pbwa to about 30 pbwa of reactive multifunctional acrylate; curing catalyst; and activator, said composition exhibiting a pull out performance after about 24 hours at a temperature of 80 °C of at least about 50 KN.

Claim 17 (Withdrawn). The adhesive composition of claim 16 wherein said curable resin is selected from the group consisting of acrylic resins, vinyl ester resins, urethane resins, polyester resins and combinations of two or more of these.

Claim 18 (Withdrawn). The adhesive composition of claim 16 wherein said curable resin comprises polymerizable vinyl ester in amount of from about 10 wt % to about 25 wt % of the composition.

Claim 19 (Withdrawn). The adhesive composition of claim 18 wherein said reactive multifunctional acrylate comprises a major proportion of acrylate that is at least tri-functional.

Claim 20 (Withdrawn). The adhesive composition of claim 19 wherein said reactive multifunctional acrylate consists essentially of acrylate that is at least tri-functional.

Claim 21 (Withdrawn). The adhesive composition of claim 20 wherein said reactive multifunctional acrylate comprises acrylate that is at least tetra-functional.

Claim 22 (Withdrawn). The adhesive composition of claim 21 wherein said reactive multifunctional acrylate consists essentially of acrylate that is at least tetra-functional.

Claim 23. A curable adhesive composition for anchoring materials in or to concrete or masonry comprising:

- a. from about 10 wt % to about 25 wt % of a polymerizable vinyl ester compound;
- b. an ethylenically unsaturated monomer reactive with said polymerizable vinyl ester;
- c. from about 5 wt % to about 10 wt % of reactive multifunctional acrylate wherein said acrylate comprises a major proportion of acrylate that is at least tri-functional;
- d. curing catalyst; and
- e. activator.

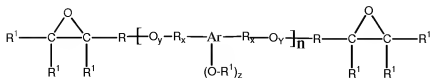
Claims 24-25 (Cancelled).

Claim 26. The adhesive composition of claim 23 wherein said reactive multifunctional acrylate consists essentially of acrylate that is at least tri-functional.

Claim 27. The adhesive composition of claim 23 wherein said reactive multifunctional acrylate comprises acrylate that is at least tetra-functional.

Claim 28. The adhesive composition of claim 27 wherein said reactive multifunctional acrylate consists essentially of acrylate that is at least tetra-functional.

Claim 29. The adhesive composition of claim 23 wherein said polymerizable vinyl ester comprises the reaction product of an epoxy compound and a compound containing an ethylenically unsaturated group, said epoxy compound corresponding to formula (I),



wherein

Ar is substituted or unsubstituted aryl.

R is substituted or unsubstituted divalent radical derived from alkyl, oxyalkyl, arylalkyl, or oxyalkylaryl,

$R^1$  is independently H or R,

for each  $R_x$ , x is independently 0 or 1,

for each  $O_y$ , y is independently 0 or 1,

for each  $(O-R^2)_z$ , z is independently 0 to 4,

provided that x and y can not both be zero, and n is from 1 to 5.

Claim 30. The adhesive composition of claim 23 wherein said ethylenically unsaturated monomer comprises vinyl toluene.

Claim 31. The adhesive composition of claim 23 wherein said the weight ratio of vinyl ester to said ethylenically unsaturated monomer is from about 0.8 to about 3.

Claim 32. The adhesive composition of claim 31 wherein said ethylenically unsaturated monomer comprises vinyl toluene.

Claim 33. The adhesive composition of claim 32 wherein said ethylenically unsaturated monomer consists essentially of vinyl toluene.

Claim 34. The adhesive composition of claim 23 having a pull out performance after one hour at a temperature of 23°C of at least about 70 KN.

Claim 35. The adhesive composition of claim 23 having a pull out performance after about 24 hours at a temperature of 23°C of at least about 80 KN.

Claim 36. The adhesive composition of claim 23 having a pull out performance after about 24 hours at a temperature of 80°C of at least about 50 KN.

Claims 37 – 51. (Cancelled).



## **EVIDENCE APPENDIX**

No additional evidence presented.

**RELATED PROCEEDINGS INDEX**

None.